

IN THE UNITED STATE PATENT AND TRADEMARK OFFICE

In re Application of:

Ryuji Uesugi

Serial No.: 10/035,224

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Group Art Unit: 1714

Examiner: NILAND, PATRICK DENNIS

For: PASTE FOR FORMING CERAMIC RIBS, PRODUCTION METHOD FOR  
THE SAME AND FORMING METHOD OF RIBS USED THE SAME

Honorable Commissioner of Patents and Trademarks  
United States patent and Trademark Office  
Washington, D.C. 20231

Sir:

DECLARATION UNDER CFR 1.132

I, Ryuji Uesugi, a citizen of Japan and residing at c/o MITSUBISHI  
MATERIALS CORPORATION, Central Research Institute Naka Research Center,  
1002-14 Mukaiyama, Naka-cho, Naka-gun, Ibaraki-ken, Japan do declare;

1. THAT, I received from the University of Electro-Communications, the  
degree of Master course in March 1997. Since April 1997, I have been working for  
MITSUBISHI MATERIALS CORPORATION, and engaged in the research and  
development of phosphor paste for PDPs, and paste for forming ceramic ribs.

2. THAT, I am one of the inventor of the invention as claimed in the  
above-referenced application and accordingly I am familiar with the specification and  
claims which comprise that application.

3. THAT, I have examined differences in shape retentive ratio between the  
paste containing the solvent mixture having a specific combination of claim 1 and pastes  
containing a solvent mixture having combinations other than in claim 1. The material,  
conditions, and results of the examination are set forth below.

Comparative Experiment 1

A paste and ribs were prepared in a manner identical to that of the Example 1 of the present description, except that diethylene glycol dibutyl ether (an ether solvent) was used as the high boiling point solvent and the solvents disclosed in the following Tables 1 and 2 were used as the low boiling point solvent. Then, the prepared ribs were allowed to stand in a muffle furnace at 30 to 35°C. After 0, 24, 48, and 120 hours elapsed, the shape retentive property (Height of the ribs (H)/ Width of the rib base (Wb)) was calculated. Then, the shape retentive ratio of the ribs when the standing time is 0 hours is assumed to be 100, and the shape retentive ratio of the ribs at each elapsed time was calculated. The obtained results are shown in the following Tables 1 and 2, and in Figure 1.

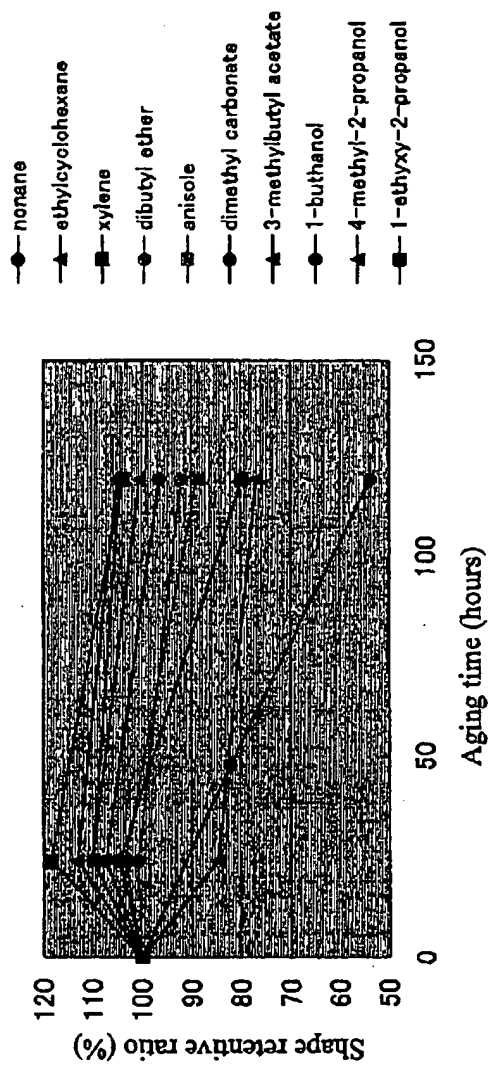
Table 1: Results of deterioration of a paste containing a hydrocarbon solvent, an ether solvent, or an ester solvent as the low boiling point solvent of claim 1

Aging Time (hours)	Hydrocarbon solvents			Ether solvents			Ester solvents	
	nonane	ethyl cyclohexane	xylene	dibutyl ether*	anisole	dimethyl carbonate	3-methylbutyl acetate	
0	100	100	100	100	100	100	100	100
24	109.9457	109.9456522	118.4895833	100.6450688	103.4147	107.15042	113.0701014	
48								
120	104.2505	100.3893576	103.6069652	92.06490483	88.80597	96.3319	104.8070459	

Table 2: Results of deterioration of a paste containing an alcohol solvent as the low boiling point solvent

Aging Time (hours)	Alcohol solvents			
	1-butanol*	4-methyl-2-propanol	1-ethoxy-2-propanol	
0	100	100	100	100
24			84.61200843	104.3526786
48	82.111086			
120	53.802157	76.83213148		79.74413646

Figure 1



It is clear from these results that the ribs made of the paste containing alcohol solvents as the low boiling point solvent have a shape retentive ratio which is lower than that of the ribs made of the paste containing another solvent (an ether solvent, an ester solvent, and an hydrocarbon solvent), and these have problems in practical use.

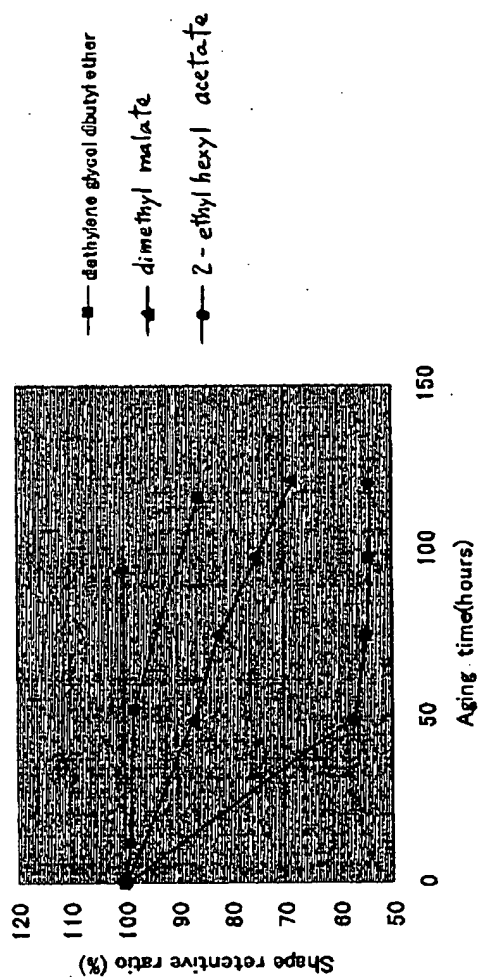
#### Comparative Experiment 2

A paste and ribs were prepared in a manner identical to that of Example 1 of the present description, except that diethylene glycol dibutyl ether (an ether solvent) and 2-ethylhexyl acetate or diethyl maleate (an ester solvent) were used as the high boiling point solvent and glass-ceramics/ ethyl cellulose/ the high boiling point solvent/ additives were added such that the component ratio was 86/1/9/4. Then, the prepared ribs were allowed to stand in a muffle furnace at 50°C. In the case of the ribs made of the paste containing an ether solvent, a shape retentive property (Height of the ribs (H)/ Width of the rib base (Wb)) was calculated after 0, 12, 52, and 116 hours elapsed. In the case of the ribs made of the paste containing an ester solvent, a shape retentive property was calculated after 48, 72, 96, and 120 hours elapsed. Then, the shape retentive property of the ribs when the standing time was 0 hours is assumed to be 100, and the shape retentive property of the ribs at each elapsed time was calculated. The obtained results are shown in the following Table 3 and Figure 2.

Table-3: Results of deterioration of a paste containing an ether solvent, or an ester solvent as the high boiling point solvent

Aging Time (hours)	Ether solvent		Ester solvent	
	diethylene glycol dibutyl ether	2-ethylhexyl acetate	dimethyl malate	
0	100	100	100	
12	98.706			
52	98.059			
116	85.7			
48		58.8	87.84	
72		56.47	82.43	
96		56.4	75.68	
120		56.3	68.92	

Figure 2



It is clear from these results that the ribs made of the paste containing an ester solvent as the high boiling point solvent has a shape retentive ratio which is lower than that of the ribs made of the paste containing an ether solvent as the high boiling point solvent, and these have problems in practical use.

When the results of the Comparative Experiments 1 and 2 are combined and considered, since the paste of claim 1 has the feature, that is, it selects the specific combination of the high boiling point solvent and the low boiling point solvent. Therefore, the paste of claim 1 produces the ribs having a high shape retentive ratio, which is higher than that of the paste of the citations, in particular, the Xue document, which contains an ester or ether solvent as a low boiling solvent and an alcohol solvent as a high boiling solvent. In other words, the paste of claim 1 has unique effects, which are not obtained by the citations.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made herein upon information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

This 7th day of December, 2004

  
Ryuji Uesugi